ESC101 : Fundamental of computing

Tutorial sheet 5 **11 September, 2008**

1. (**Design of methods for simple tasks**)
   In an interactive fashion with the students, please design methods for each of the following tasks.
   - Determine if a number is prime.
   - Determine if three numbers correspond to sides of a triangle.
   - Compute average of three numbers.

2. (**scope of variables**)
   What will be the output of the following program ?

```
class scoping
{  public static int fun(int i)
   {
      int j;
      int k = i*i;
      j = k+2;
      System.out.println(i+","+j+","+k);
      return j;
   }

   public static void main(String args[])
   {
     int j=100;
     int k = j%12;
     {
       int i=k+2;
       i = fun(i);
       System.out.println(i+","+j+","+k);
     }
     int i = 3;
     k = fun(fun(i));
     System.out.println(i+","+j+","+k);
  }
}
```

   Answers :
   6,38,36
   38,100,4
   3,11,9
   11,123,121
   3,100,123

3. It was shown by various examples in the lectures till now that arriving at solution of a problem is a sequence of systematic steps : solving the problem for some input instances using paper and pen, making careful observations based on these solutions, sometimes solving a simpler problem related to the given problem, and after developing enough insight into the original problem, we arrive at the solution of the given problem. As an exercise, try to discuss the following problem. **PLEASE DO NOT SOLVE THIS PROBLEM COMPLETELY in the tutorial**. It should serve as a *homework* for them. The objective is that the students should develop the analytical habit for solving the problem. The solution of the problem will be posted on the course website after few days so that they may verify the correctness of their solution.

   Design a program for the following problem using methods. Given an integer n, you have to compute another integer n' by swapping any two digits of n such that n' is strictly greater than n and $n' - n$ is smallest. If there is no such n' exists, report this as a message on screen. For example for $n = 45697543$, n' is 45796543; and for $n = 45297543$, n' is 45397542. For $n = 9876543$, no n' exists.